

NCAR Proposal No. 2003-324 (formerly 1995-118 & 95-34)

## **Final Report**

### **Science Coordination in Support of the U.S. Weather Research Program Office of the Lead Scientist (OLS) and for Coordination with the World Weather Research (WMO) Program**

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1 May, 2005

Report for 1 February, 2004 through 31 January, 2005

#### **1. Introduction**

This document is the final report of the work of the Office of the Lead Scientist (OLS) of the U.S. Weather Research Program (USWRP) and for Coordination of the World Weather Research Program (WWRP). The proposal was for a continuation of the duties and responsibilities described in the proposal of 7 October, 1993 to NSF and NOAA associated with the USWRP Lead Scientist then referred to as the Chief Scientist. The activities of the Office of the Lead Scientist (OLS) ended on January 31, 2005 and this report describes the activities undertaken by the OLS from February 1, 2004 until January 31, 2005. The OLS activities were under the co-sponsorship of the agencies that are members of the Interagency Working Group (IWG) of the USWRP currently: NOAA, NSF, NASA, and DOD. The scope of the work described includes activities that were necessary to develop, facilitate and implement the research objectives of the USWRP consistent with the overall program goals and specific agency objectives. It included liaison with and promotion of WMO/WWRP activities that were consistent with and beneficial to the USWRP programs and objectives. Funds covered several broad categories of activity including meetings convened by the Lead Scientist, OLS travel, partial salary and benefits support, publications, hard-copy dissemination of reports and program announcements and the development and maintenance of the USWRP website. In addition to funding covered by this grant, NCAR program funds provided co-sponsorship of half the salary and benefits resources of the USWRP Lead Scientist (.25 FTE) and the WWRP Chairman/Liaison (.167 FTE). Also covered by the grant were partial salaries for the Science Coordinator for the hurricane portion of the program and partial salary for a THORPEX coordinator.

#### **2. Accomplishments- 1 February, 2004 through 31 January, 2005**

The general functions of the Lead Scientist are described in the USWRP terms of reference. The principal focus was to continue implementation of the research plans developed over the last several years and in particular, the various projects that have been outlined in the implementation plans. Below we will discuss accomplishments for each of the specific activities in last year's proposal.

Specific activities listed in the proposal for FY04:

- a) *Maintain the USWRP Website* at a .25 FTE level (Sherrie Fredrick). This was as ongoing

activity. Although the OLS activities have ended, we continue to maintain the website at a much reduced level. During the last year the OLS continued to promote the site as a means for routine dissemination of information concerning the Program.

- b) *Publish and post reports.* The following reports were published during this year or are in various stages of preparation. All the reports are posted on the USWRP website, <http://uswrp.org>

BAMS 1855 - (published in the July 2004 issue of the Bulletin) "Research and Development to Improve Quantitative Precipitation Forecasts in the Warm Season", by J.M. Fritsch and R.E. Carbone (NCAR Technical Note 458+PROC, printed in April 2004)

Elsberry, R. L., 2005: Achievement of USWRP Hurricane Landfall research goal. Bull. Amer. Meteor. Soc., 86, 643-645

BAMS 1740 - (published in the April 2004 issue of the Bulletin) "Meteorological research needs for improved air quality forecasting: Report of the 11th Prospectus Development Team of the U.S. Weather Research Program," Walter F. Dabberdt, Mary Anne Carroll, with Darrel Baumgardner, Gregory Carmichael, Ronald Cohen, Tim Dye, James Ellis, Georg Grell, Sue Grimmond, Steven Hanna, John Irwin, Brian Lamb, Sasha Madronich, Jeff McQueen, James Meagher, Talat Odman, Jonathan Pleim, Hans Peter Schmid, and Doug Westphal

BAMS 1888 - (this paper is scheduled for the June 05 issue) - "Design and Development of Multi-functional Mesoscale Observing Networks in support of Integrated Forecasting Systems" - February 17, 2005 - Walter F. Dabberdt, Thomas W. Schlatter and Frederick H. Carr with Elbert W. Joe Friday, David Jorgensen, Steven Koch, Maria Pirone, F. Martin Ralph, Juanzhen Sun, Patrick Welsh, James W. Wilson and Xiaolei Zou - Submitted to BAMS on February 18, 2005

BAMS 1954 - Submitted for publication - "Improving Short-Term (0-48 hour) Cool-season Quantitative Precipitation Forecasting: Recommendations from a USWRP Workshop", F. Martin Ralph, Robert M. Rauber, Brian F. Jewett, David E. Kingsmill, Paul Pisano, Paul Pugnier, Roy M. Rasmussen, David W. Reynolds, Thomas W. Schlatter, Ronald E. Stewart, Jeff S. Waldstricher (NCAR Technical Note 465+STR, printed May 2004)

Submitted to BAMS on February 16, 2005 - "Report of the USWRP Workshop on Air Quality Forecasting" by Walter F. Dabberdt, Mary Anne Carroll, William Appleby, Darrel Baumgardner, Gregory Carmichael, Paula Davidson, J. Christopher Doran, Timothy S. Dye, Susan Grimmond, Paulette Middleton, William Neff, and Yang Zhang

- c) *Hurricane Landfall Coordinator (Russ Elsberry)*

Two major field experiments occurred or were being planned during the period. The Coupled Boundary Layer Air-Sea Transfer (CBLAST) under the sponsorship of the Office of Naval Research, and in cooperation with the NOAA Hurricane Research Division (HRD), completed their field program during the 2004 hurricane season. I participated in their planning meeting in March 2004, and assisted in the securing of

USWRP funding to extend their analyses into FY05. The field experiment was considered to be a success and plans are being made to publish the experiment results and preliminary modeling studies, and to transition the results to the NOAA and Navy operational modeling centers.

The NASA Tropical Clouds, Systems, Processes field program is planned for summer 2005, again in cooperation with the HRD. One of the foci will be on the genesis and early intensification of the tropical cyclone, which is a key interest of the Hurricane Landfall program. I participated in the review of more than 100 proposals for this program. A complementary field program called RAINEX sponsored by NSF will explore the role of rainbands in the structure change of tropical cyclones.

I continued to play an active role as the USWRP representative on the Steering Committee of the Joint Hurricane Testbed. This task involved a review of the 15 second-year proposals for cycle 2, review of approximately 60 pre-application proposals for cycle 3, and then the 23 full proposals for cycle 3. My term on the Steering Committee ended with the end of my USWRP funding in December 2004.

I served as the co-Director of the First International Workshop on Tropical Cyclone Landfall Processes that was held in Macau during March 2005. I organized the non-Chinese participation, arranged the program and working groups, and have written the report. Four future programs related to tropical cyclone landfall were endorsed, as was a recommendation for integration of social science in the future meteorological research program.

I continue to serve as the Tropical Cyclone Rapporteur for the WMO/CAS Tropical Meteorology Research Program. I also am serving on the International Committee for the Sixth International Workshop on Tropical Cyclones to be held in Costa Rica in November 2006.

*d) THORPEX Coordinator (Dave Parsons)*

The North American Regional Committee hosted the 1<sup>st</sup> THORPEX Science Symposium in Montreal on December 6<sup>th</sup>–10<sup>th</sup>, 2004. Nearly 200 participants from 36 countries registered for this symposium and Parsons was program co-chair. Information on the symposium can be found at [http://www.wmo.int/thorpex/first\\_int\\_science\\_symposium\\_montreal.html](http://www.wmo.int/thorpex/first_int_science_symposium_montreal.html).

Parsons and the US members of the North American Regional Committee organized a U.S. Workshop on the Implementation of THORPEX on 19-20 August 2004 to obtain U.S. input to the International Science and Implementation Plans. Approximately 100 participants attended from the U.S. research and operational communities. The agenda and links to the presentations are at: [http://box.mmm.ucar.edu/uswrp/recent\\_meetings/ThorpexWorkshop/agenda\\_presentation.html](http://box.mmm.ucar.edu/uswrp/recent_meetings/ThorpexWorkshop/agenda_presentation.html).

Parsons served as a member of the committee overseeing the Vaisala THORPEX Fellowship program. Two early career scientists received Fellows under this program during this past

year.

The following THORPEX briefings and seminars were presented:

- *“The US THORPEX Programme”* to Brigadier General (USAF retired) David L. Johnson; the assistant administrator for Weather Services at NOAA’s National Weather Service.
- *“Status of the THORPEX Programme”* to USWRP Science Steering Committee.
- *“An Overview of THORPEX and Proposed NASA Participation”* at NASA HQ.
- *“THORPEX and Future Field Campaigns”* to the NSF Observing System Facility Panel.
- *“North American Prospective on THORPEX”* to the Science Steering Committee of the World Weather Research Program.
- *“THORPEX Observing Systems Research”* to the participants of the annual Airborne Vertical Atmosphere Profiling System (AVAPS) Users Meeting.
- *“THORPEX and Driftsonde”* presented at French CNES meeting to establish international collaboration on soundings from stratospheric balloons.
- *“THORPEX and the future of Numerical Weather Prediction”* at the GPS COSMIC retreat.
- *“THORPEX”* was presented at the 2nd NORTH AMERICAN ENSEMBLE FORECAST SYSTEM WORKSHOP at NCEP, 16-18 November 2004.
- *“An Overview of THORPEX – A Global Atmospheric Research Program”* was presented at NASA Goddard, 19 November 2004.
- *“Status report of the North American THORPEX Planning Process”* was presented to the THORPEX International Core Steering Committee, 2-3 December 2004.
- *“Perspective of the North American Regional Committee on Future THORPEX Campaigns”* was presented at the 1<sup>st</sup> THORPEX Science Symposium, 6-10 Dec. 2004.
- Provided materials on THORPEX for presentation by NCAR management to the Director of NSF.

Parsons represented the North American Regional Committee as a member of the WMO Expert Group to develop the THORPEX Implementation Plan (EG-TIP). The group is proposing the future areas of emphasis for the THORPEX programme from under the broad umbrella of the International Science Plan. The group held four meetings between February and November 2004 with writing assignments resulting from each meeting. Parsons

organized the 4<sup>th</sup> EG-TIP meeting in Boulder. The EG-TIP delivered a completed THORPEX Implementation Plan for approval by the International Core Steering Committee (ICSC) at their meeting on the 2<sup>nd</sup> to 3<sup>rd</sup> December 2004. Other U.S. members of the TIP include M. Shapiro (NOAA), Z. Toth (NOAA) and J. Purdom (CSU). A copy of the TIP can be found at [http://www.wmo.int/thorpex/ep\\_tip.html](http://www.wmo.int/thorpex/ep_tip.html).

Parsons is the co-chair of the Observing Systems Subprogramme of the International Science Steering Committee and thus was one of the co-authors of the Observing Systems section of the International Science Plan. A copy of the International Science Plan can be found at <http://www.wmo.int/thorpex/publications.html>.

In addition to discussions at the above meetings, Parsons participated in discussions on the future direction of THORPEX during i) the monthly USWRP Conference Calls, ii) on THORPEX, AMMA and Hurricane Prediction collaborations at NCEP, iii) with NCAR and UCAR management, iv) with Congressional Delegations and other Dignitaries visiting NCAR, v) at the NOAA Workshop on Integrated Surface Observing Systems, vi) with Dr. Rick Rosen, Director of NOAA/OAR (16 Nov), vii) with NSF program managers (17 Nov), viii) with NASA Goddard staff and management (Nov. 19), and ix) with NSF program managers.

Parsons worked with agency science leads (Toth-NOAA, Reynolds-NRL, Miller-NASA, Kalnay/Keyser/Tribbia-NSF) and others in the research and operational community to support agency goals while pushing for the development of a coherent U.S. interagency response to THORPEX. The development has been held back to some extent by the reset of the USWRP, but will hopefully resume with the naming of the new U.S. representative to the ICSC.

The 1st draft of the U.S. Interagency Call for THORPEX Participation has been completed and is available for comment at <http://www.mmm.ucar.edu/uswrp/programs/nathorpex.html>. The second draft will be released on 15 May 2005. Revision of the N. American plan will take place shortly after that date.

*e) Develop an Implementation Plan for Air Quality Forecasting.*

This activity was put on hold at the request of the IWG during its meeting at the AMS Annual Meeting in January 2004, at least until the USWRP reset process was completed. That process was to evaluate the current state of the USWRP and recommend changes that would make the program more effective. However, it was not completed before the OLS ended on February 1, 2005. However, the report on the Air Quality Forecasting PDT was completed and it appeared in the literature. The report from the workshop on Air Quality Forecasting was submitted to BAMS. See above under *b) Publish and Post reports*.

*f) Conduct meetings of the USWRP/SSC.*

One meeting was held in January 27-28, 2004 to review half of the USWRP projects that

were underway. These included JHT, WRF, IHOP and CAMEX. This review resulted in reports from the meeting working groups associated with each of these four programs. These reports were made available to the committee considering a reset of the USWRP. We discussed with the Reset Committee whether we should proceed with reviewing the remaining USWRP programs using the SSC and after an attempt to find a date when all SSC members could attend, it was decided that it would not be possible to complete the review before the Reset Committee needed to report out to the full IWG. At that time we expected that the review would continue after the reset was complete. However, the reset process was still not complete by February 1, 2005, when the OLS ended. It is not clear that the reset will ever be complete and at the moment, the USWRP is on hold.

g) *Conduct a Prospectus Development Team (PDT) meeting.*

There were no requests from the IWG for further PDTs and none were held.

h) *Facilitate the CONDUIT Working Group.*

This group was scheduled to meet twice during the year but only held one meeting, in conjunction with the AMS Annual Meeting, January 11, 2005. During the year there was considerable discussion concerning whether CONDUIT Committee should be combined with the CRAFT Committee. It was eventually decided that they should be combined and the new committee was designated C2. It was the C2 Committee that met at the Annual Meeting in January. Much of the discussion focused on the future of the Committee since the OLS was ending and it was not clear how the Committee would be sponsored. There was no decision since the USWRP is still in a very uncertain state.

i) *Continue development of plans for field programs.*

These are outlined in the Hurricane Landfall and DA/QPF/Optimal Mix Implementation Plans. This includes:

- a. *Field activities related to Hurricane Landfall.* See the discussion under Hurricane Landfall Coordinator
- b. *Other field Programs.* See discussion under THORPEX.

j) *World Weather Research Programme (Rit Carbone).*

During the previous funding year I transferred the duties of WWRP Chairman to Philippe Courtier of France but remained for a final year on the WWRP SSC. In this capacity I attended and hosted the SSC meeting at NCAR in October 2004. We reviewed all of the major programs of the WWRP including THORPEX. We also agreed to hold a workshop to organize a hydromet prediction testbed at NCEP HPC. This was successfully organized between October and January 2005, with broad national and international participation. It will be held 18-20 May 2005 with a principal focus on forecast process between models and predictions and improved methods of verification. I will attend one remaining SSC meeting to complete my term in late summer of 2005.

#### 4. Budget

The funding requested for the period 1 February 2004 through 31 January 2005 was \$620,210 to NCAR. This amount does not include funds going directly to the home institution for the Hurricane Science Coordinator position. Of the \$620,210, a total of \$566,321 was received from NOAA, NSF, NASA and USAF/DOD. The NRL contribution was not received. At the end of the OLS, a total of \$131,665 remained as carryover funds (\$101,909 NSF and \$29,756 NOAA). In consultation the appropriate program managers of these two organizations, these remaining funds were transferred to the USWRP program, Developmental Testbed Center primarily for its visitor program and general DTC facility development and maintenance.